Matrix & Daisy Chain
HDMI Extender over CAT.5e/6 & Fiber Optic

User's Manual

1. Introduction

Thanks for purchasing the Smart Matrix & Daisy Chainable HDMI Extender over CAT.5e/6 & Optical Fiber. Please read this manual and retain for future reference.

1.1 Features

- Only one CAT5e/6 & Fiber Optic cable required
- Adoptive visually lossless compression algorithm
- HDMI Digital Audio/Video extended distance up to 100 meters (330 feet) between Transmitter and Receiver (point-to-point); up to 30 kilometers between Transmitter and Receiver over Fiber Optic cabling (based on the quality of Fiber Optic and Transceiver modules). Supports Full HD video 1080P Deep Color and PC resolution 1920x1200@60Hz signals, over CAT.5e/6 cabling
- Smart supporting Crosspoint & Daisy Chain connection for both Transmitter and Receiver units.
- Mapping different TX source, even some grouping loop for each receiver by LINK ID.
- Video wall function supported, easily configurable through web UI
- Built-in Ethernet switch, cost-effective with high flexibility for expansion
- Wall-mount housing design for easy and robust installation
- Automatic Display Mode Detection
- Supports both Interlaced and Progressive Display Modes
- Supports DDC/DDC2B, Hot-Plug Detection (HPD) and HDCP compliant functions
- Supports Default EDID and EDID copy function for optimal PC-to-Screen performance
- Infrared Remote (IR) signal control communication
- Supports Serial (RS-232) bi-directional

1.2 Package Contents

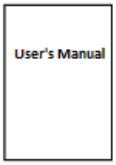
1.

2.

3.

4.
(IR blaster cable)

(IR receiver cable)

5. 

1. HDMI Extender Transmitter (TX) x 1
2. HDMI Extender Receiver (RX) x 1
3. Power Supply DC 5V / 2A (TX & RX pair units) or optional 1 (single unit)
4. IR cables (IR blaster cable x 1; IR receiver cable x 1)
5. User's Manual x 1

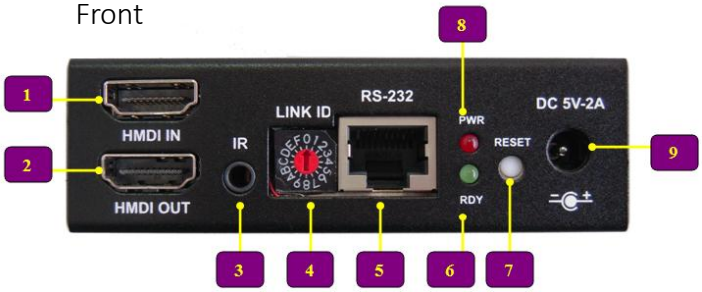
2. Specifications

			Transmitter	Receiver
Console Connectors	HDMI Output		HDMI (Female)	HDMI (Female)
	RS-232 Control Port		RJ-45	RJ-45
PC Connectors	HDMI Input		HDMI (Female)	N/A
Extension Port	RJ-45		Full HD Video 1080p @30Hz / Audio Extension + IR + RS-232	
RJ-45			3 (Line In or Line Out)	3 (Line In or Line Out)
Fiber Link			1	1
Daisy Chainable			Up to 10 layers	Up to 10 layers
Audio			Supports High Definition Audio (HD) 5.1/6.1/7.1 Surround Sound	
Infrared Remote (IR)			Unidirectional	
LED Indicators	Local	Power	Red LED	
		Link	Green LED	
	Remote	Power	Red LED	
		Link	Green LED	
DDC Supported			DDC, DDC2, DDC2B	
Extension Cable Type & Length			CAT.5e / CAT.6 Extending Length: 100m	
Max. Video Resolution			1920x1200@60Hz, Full HD 1080p@30Hz	
Wide Screen Supported			Yes	
OS Compatibility			OS Independent	
Power Supply			External DC 5V / 2A Power Supply	
Dimension (L x W x H)			155 x 90 x 28.5 mm	
Weight			430g	425g
Housing material			Metal	
Operating Temperature			32 - 122°F (0 - 50°C)	
Humidity			0% - 80% RH	

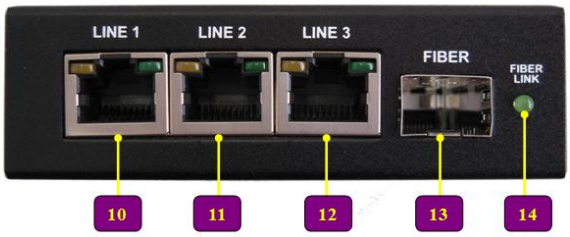
3. Layout and Descriptions

Transmitter (TX):

Front



Back



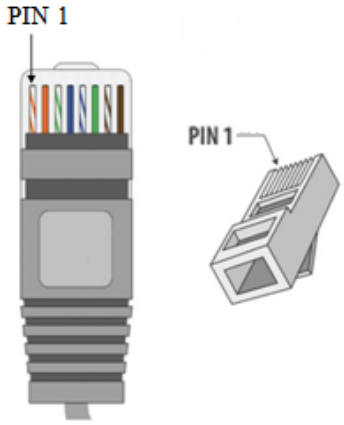
1. **HDMI IN**: Connect a Hi-Definition AV source to this port.

2. **HDMI OUT**: Connect a HDTV or Hi-Definition monitor to this port. (HDMI loopback)

3. **IR**: IR blaster port, connect the IR blaster cable to this port.

4. **LINK ID**: ID selector, select AV Source (Max. 16 AV sources with ID 0 – F per unit).

5. **RS-232 Port**: Connect a RS-232 to RJ-45 adapter (optional) to this port.



RJ-45 PIN Assignment

1. RS232 – TXD
2. RS232 – RXD
3. GND
4. NC
5. NC
6. GND
7. Debug - TXD
8. Debug - RXD

RS-232 over IP

engineering mode

Note: The adapter could be made by user and the pin assignments are indicated on the above diagram.

6. RDY (Ready), 7. RESET, 8. PWR: Please refer to the following instructions.

Red and Green LED State for Power up:

Red LED turns blinking and Green LED is dark → system no setup

Red LED turns bright and Green LED is blinking → system setup, but AV source or LINE is disconnected

Red and Green LED turn bright → the TX and RX units are communicating correctly.

Reset Button State for system function selection

Button State	TX (Host side)	RX (Client side)
Short Press (Red and Green LED to dark)	System to reset	System to reset
Long Press (Press until Red LED dark off and Green LED lighted)	Use TX HDMI Loopback port EDID in AV group (Loopback EDID adopted)	Use RX HDMI output port EDID in AV group (Update EDID)
Long Press (Press until Red and Green LED to bright)	Engineering Mode and Reset to default	Engineering Mode and Reset to default

Descriptions:

■ Use TX HDMI Loopback port EDID in AV group:

This feature is for the client side "Update EDID".

■ Use RX HDMI output port EDID in AV group:

"Use Loopback EDID" & "Update EDID" feature is used for Multicast Mode to select which monitor/TV EDID is used for system wide EDID usage.

For multicast setup, the monitor/TV may be with lower resolution. For example, one monitor/TV with 720p resolution is receiving 1080p video; please select the monitor/TV with the lowest resolution to ensure all the monitors can be displayed correctly.

For customer using 1 pair of Host/Client with Multicast mode, the end-user must update EDID correctly. If not, it will cause compatibility issue.

- Operation:

  Once the button event is triggered correctly at the client side, the system will be setup correctly for Multicast. The selected EDID will be updated to Host Side EEPROM

The same operation applies for Loopback EDID. In the system setup, the last EDID updated will stay in the EEPROM. If this button is setup many times, the last one will be applied.

■ Engineering Mode:

1. Static IP: 192.168.0.88
2. User can connect to http://192.168.0.88 webpage for firmware update.
3. Firmware update file name:

   Host : webfwh.bin

   Client : webfwc.bin

■ Reset to Default:

1. Reset any changes in SPI flash setup flag.
2. Re-generate Random MAC address to avoid any possible MAC collision.
   After Reset to Default and reboot cycle, a new random MAC address will be generated.

9. **Power Connector**: Connect the included 5V DC power supply to this receptacle.

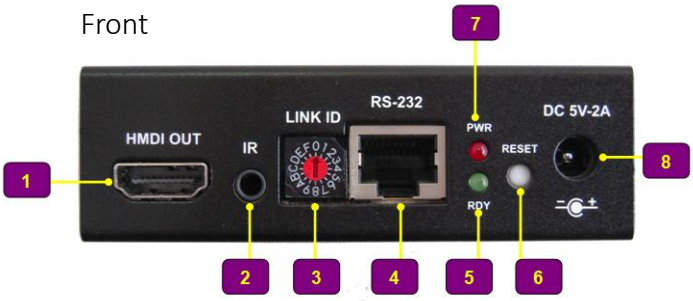
10. – 12. **LINE1 – LINE3**: Connect TX's or RX's LINE port to this port for AV packets.

13. **FIBER**: Connect TX's or RX's FIBER port to this port for AV packets.

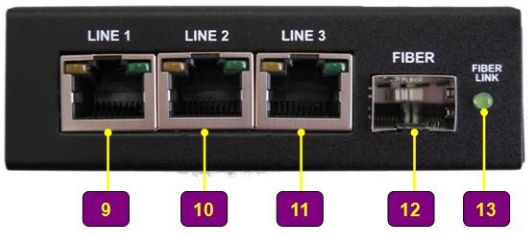
14. **FIBER LINK**: This LED will turn bright green once the TX and RX units are ready. LED will turn blinking when the data is being transmitted between two units via fiber optic cable.

Receiver (RX):

Front



Back

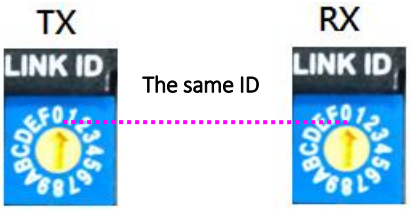


1. HDMI OUT: Connect a HDTV or Hi-Definition monitor to this port.

2. IR: IR receiver port, connect the IR receiver cable to this port.

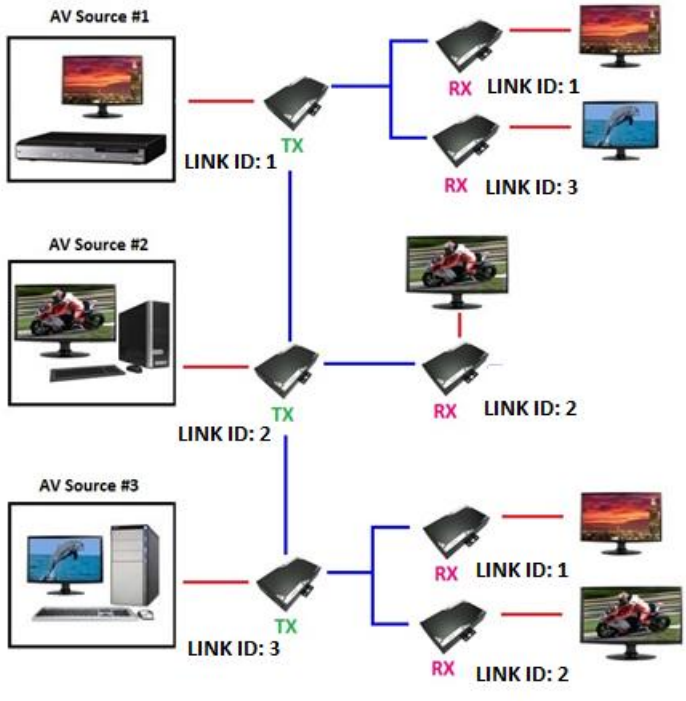
3. LINK ID: ID selector, select AV source (Max. 16 AV sources with ID 0 – F per unit).

- Single AV source:



For single AV source, adjust RX's LINK ID to be the same as TX's then RESET RX.

- Multiple AV sources:



For multiple AV sources, adjust each RX's LINK ID to be same as the one of TX connected to the AV source which you would like to enjoy.

RESET RX after its LINK ID has been changed.

Please refer to the left example with 3 AV sources.

4. RS-232 Port: Connect a RS-232 to RJ-45 adapter to this port, for RJ-45 pin assignment, please refer to TX.

5. RDY, 6. RESET, 7. PWR: Please refer to TX for detailed instructions.

8. Power Connector: Connect the included 5V DC power supply to this receptacle.

9. – 11. LINE1 – LINE 3: Connect TX's or RX's LINE port to this port for AV packets.

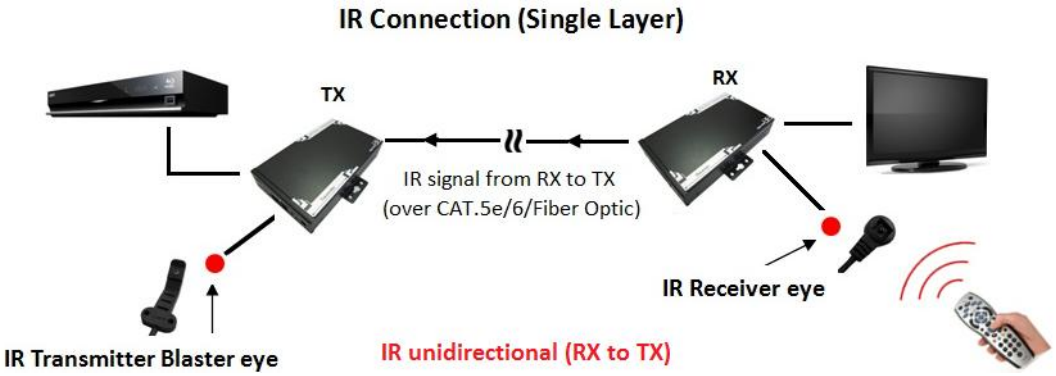
12. FIBER: Connect TX's or RX's FIBER port to this port for AV packets.

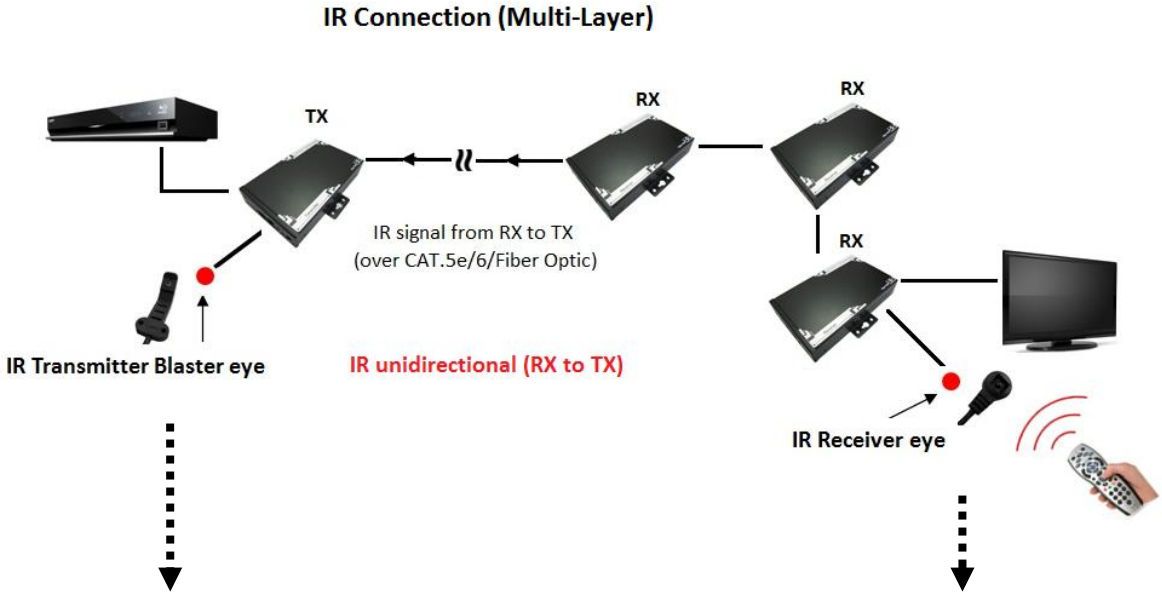
13. FIBER LINK: This LED will turn bright green once the TX and RX units are communicating correctly via fiber optic cable.

IR and RS-232 Connection Diagram

IR connection

- Connect the IR blaster cable to the TX's IR connector.
- Connect the IR receiver cable to the RX's IR connector.
- Put the remote control pointed to the IR receiver eye.
- Put the IR Transmitter Blaster eye pointed to the IR sensor of the AV source which is intended to be controlled by the remote control.





Connect the IR blaster cable to TX

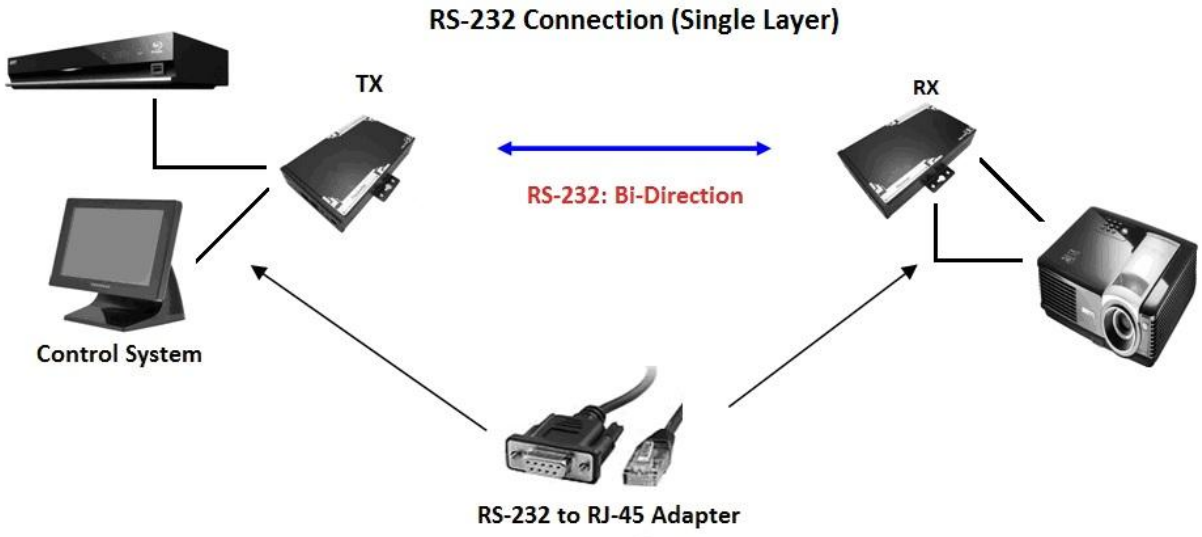
Note:

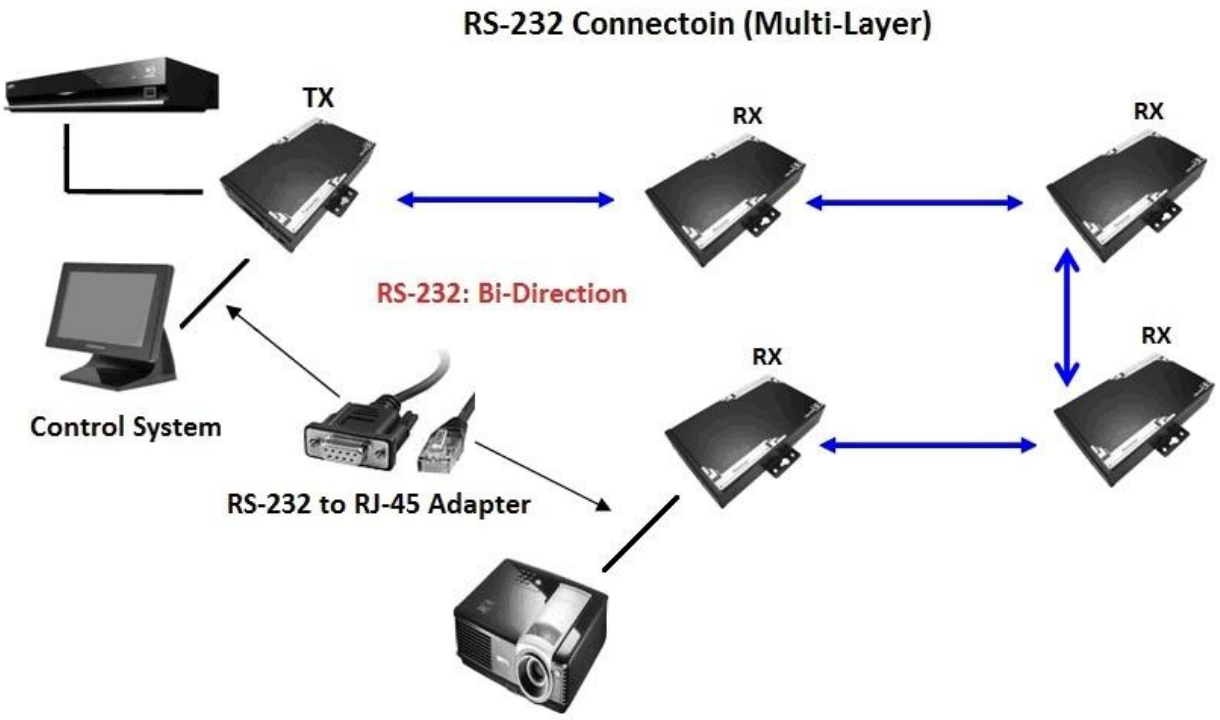
The IR works only when the data is being transmitted between TX and RX.

Connect the IR receiver cable to RX

RS-232 connection

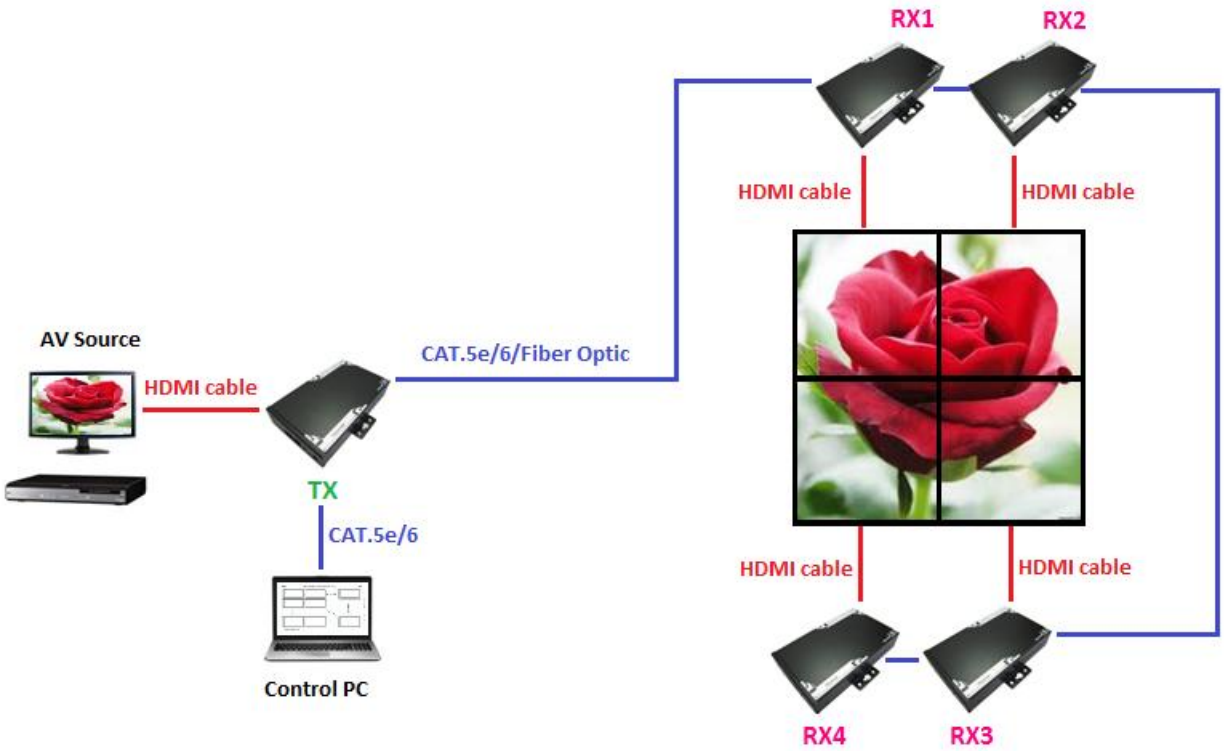
- Connect the device (e.g. PC, projector…etc) to the RS-232 port of RX by a RS-232 to RJ-45 adatper.
- Connect the control system to the RS-232 port of TX by a RS-232 to RJ-45 adapter.
- Operating the control system.
- The RS-232 connection is bi-directional, the device and the control system are interchangeable and Control System is able to control the device at TX or RX.





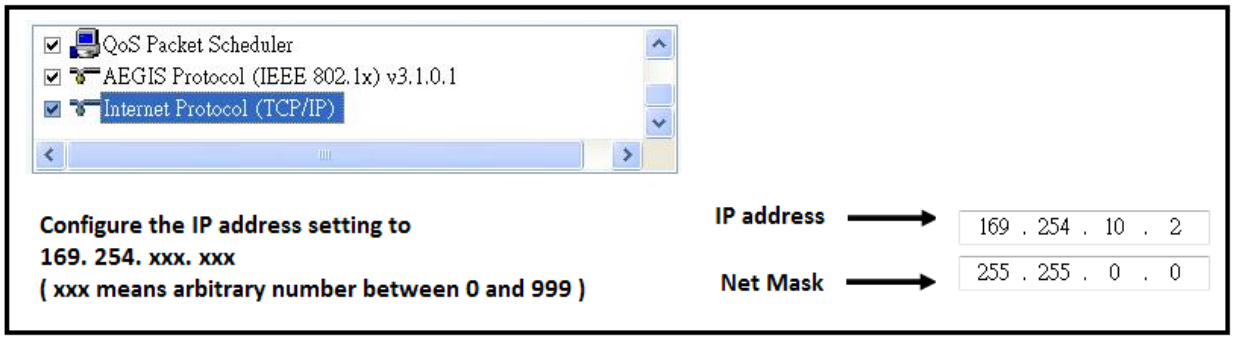
4. Video Wall with Single AV Source

Video Wall is supported by the free software called Bonjour. Make sure the control PC has been installed the Bonjour SDK, If the control PC (Windows OS) doesn't install Bonjour SDK yet, please install it. Google "bonjour SDK download" for the installation file or download it here: http://developer.apple.com/opensource/

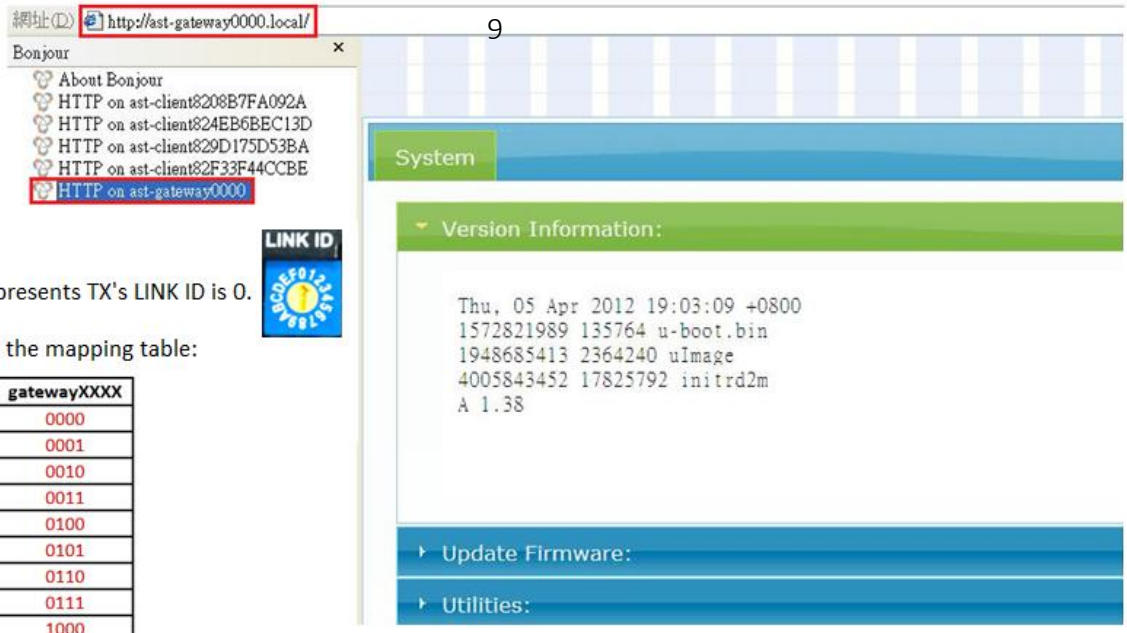


Setup Procedures for Single AV Source 2 x 2 Video Wall

4.1. Configure the control PC 's IP address setting to 169. 254. xxx. xxx with Net Mask 255.255.0.0, xxx means arbitrary number between 0 and 999.


QoS Packet Scheduler
AEGIS Protocol (IEEE 802.1x) v3.1.0.1
Internet Protocol (TCP/IP)
Configure the IP address setting to
169. 254. xxx. xxx
(xxx means arbitrary number between 0 and 999)
IP address
169 . 254 . 10 . 2
Net Mask
255 . 255 . 0 . 0

4.2. Open control PC's IE or Google Chrome. Link to TX by web address http://ast-gateway0000.local/vw/ , if the link is successful, you will see the following web page:



Note:

- 0000 represents TX's LINK ID is 0.
- Below is the mapping table:

LINK ID	gatewayXXXX
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

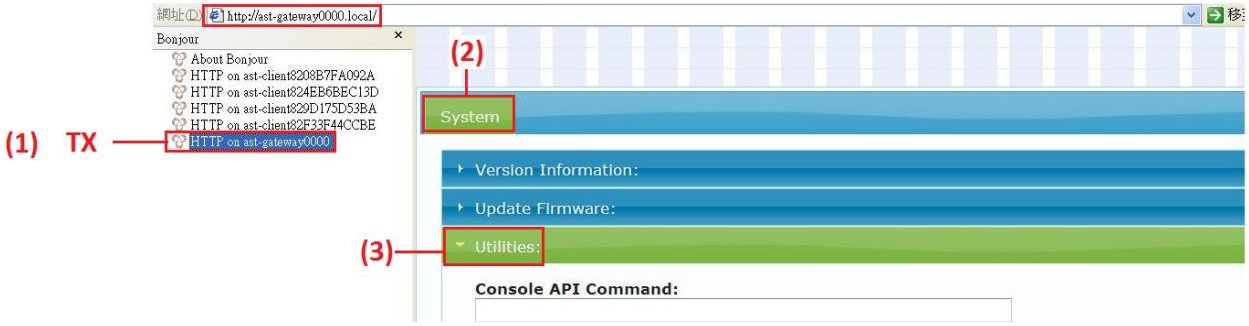
4.3. System setup for TX:

Follow the below (1) to (7) steps for System setup for TX.

Step (1): Choose and double click TX

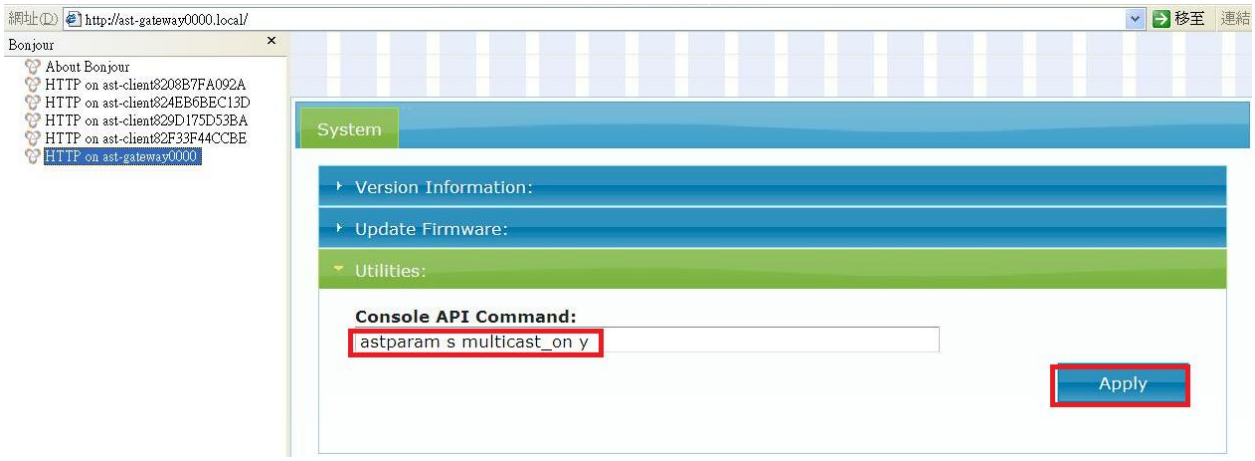
Step (2): Choose System

Step (3): Choose Utilities:



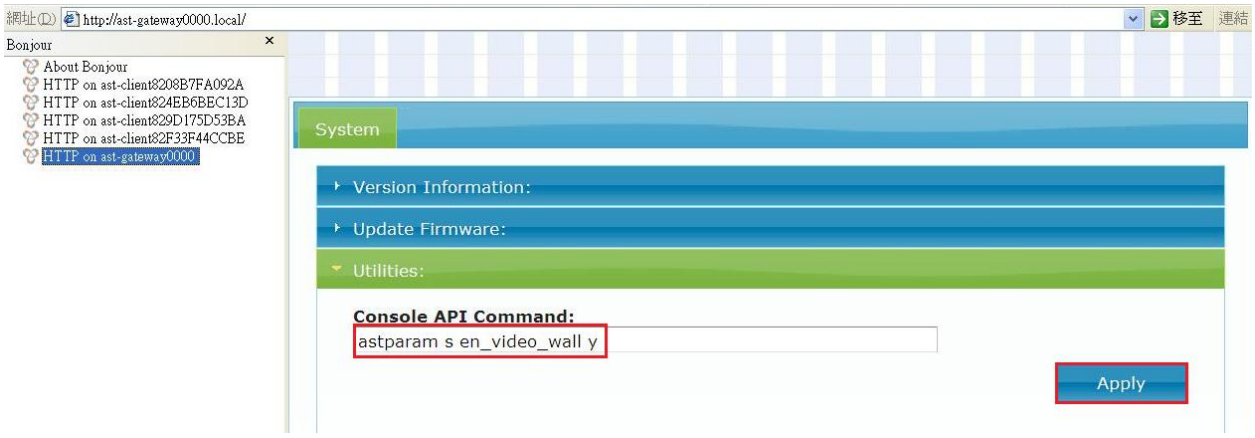
Step (4): Console API Command:

key in astparam s multicast_on y, then click Apply.



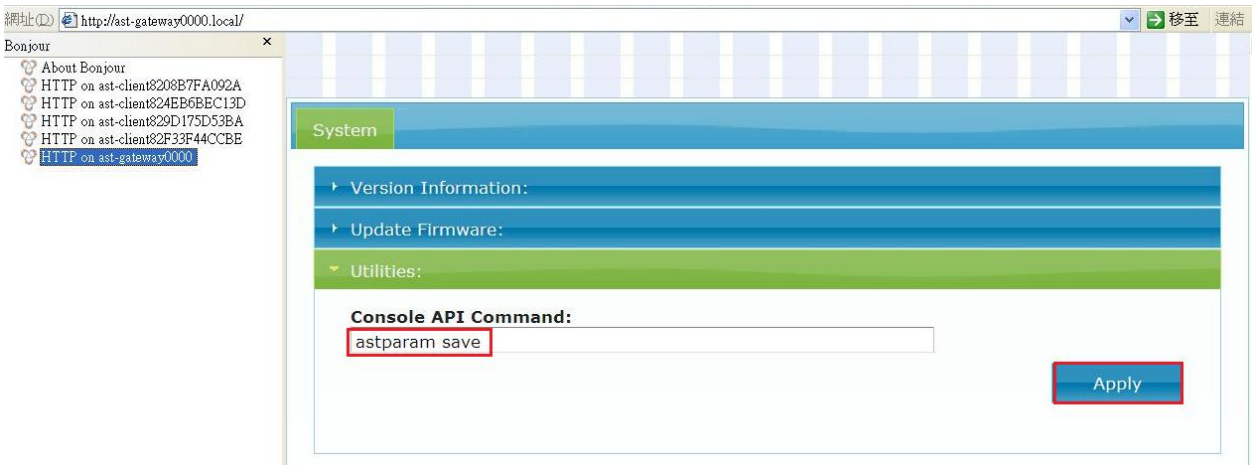
Step (5): Console API Command:

key in astparam s en_video_wall y, then click Apply.



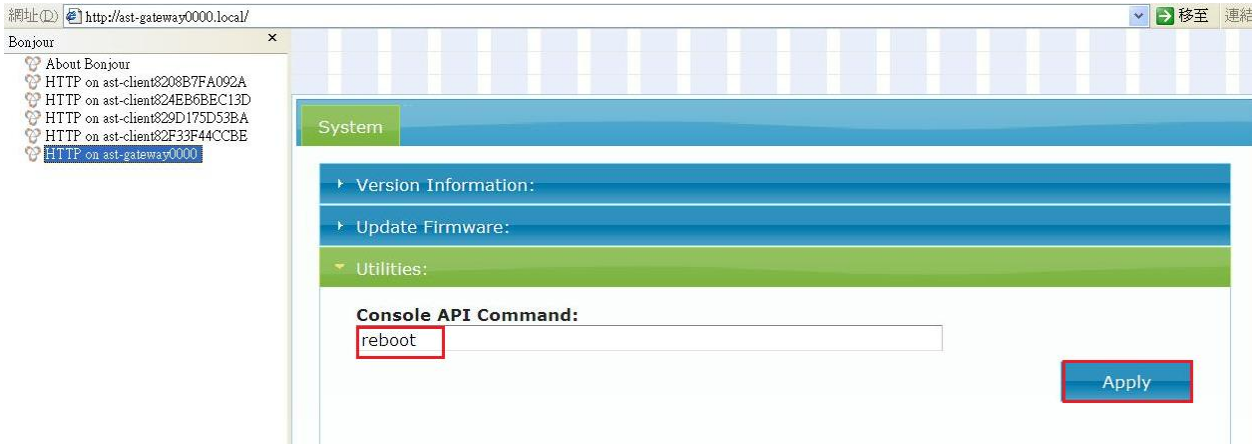
Step (6): Console API Command:

key in astparam save, then click Apply.



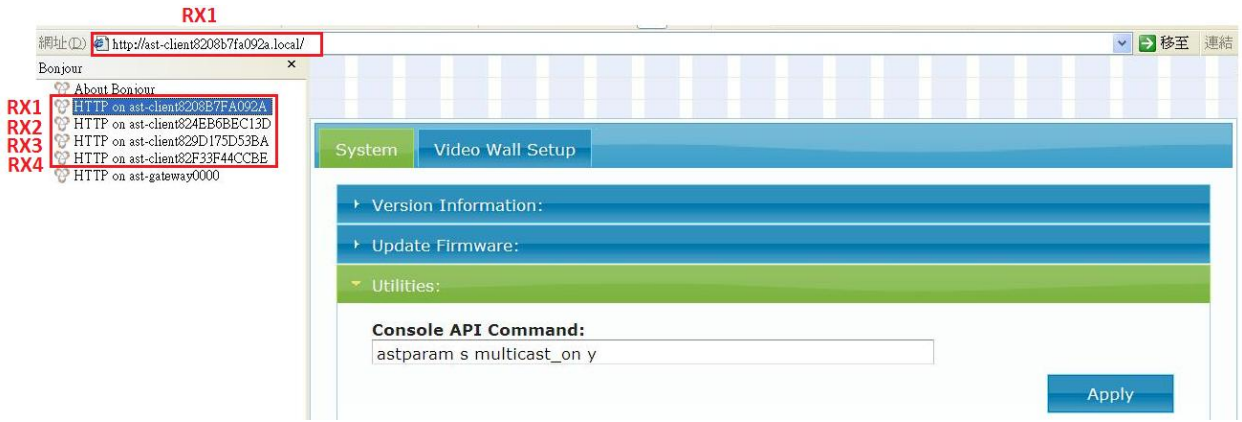
Step (7): Console API Command:

key in reboot, then click Apply.



The System setup for TX is finished after reboot.

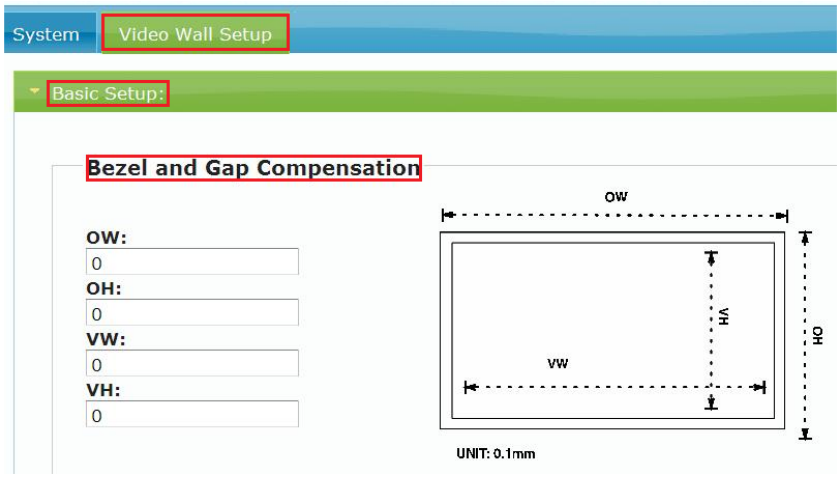
4.4. System setup for RX:



- Choose and double click RX1 and repeat the above steps from step (2) to step (7), then RX2, RX3, and RX4.
- System setup for RX is completed after all the 4 units RX have been setup by the above steps from step (2) to step (7).

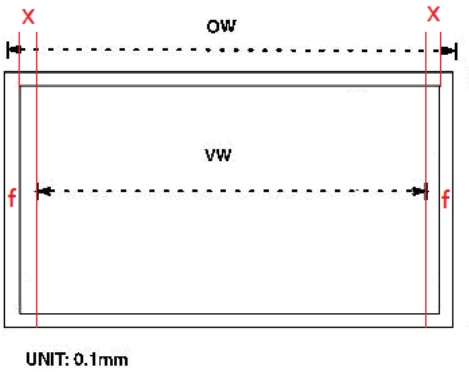
4.5. Video Wall Setup

4.5.1. Basic Setup: Bezel and Gap Compensation



OW: Outside Width
OH: Outside Height
VW: Viewable Width
VH: Viewable Height
OW, OH, VW, VH must be integer

Below is the example about OW and VW:



OW = VW + 2f + 2X ---------- (*)

Example:

Measure Monitor's width to obtain OW.

If Monitor's width is 56cm, then OW is 5600.

(56cm = 560mm = 5600 UNIT, because 1UNIT = 0.1mm)

Measure Monitor frame's length (f).

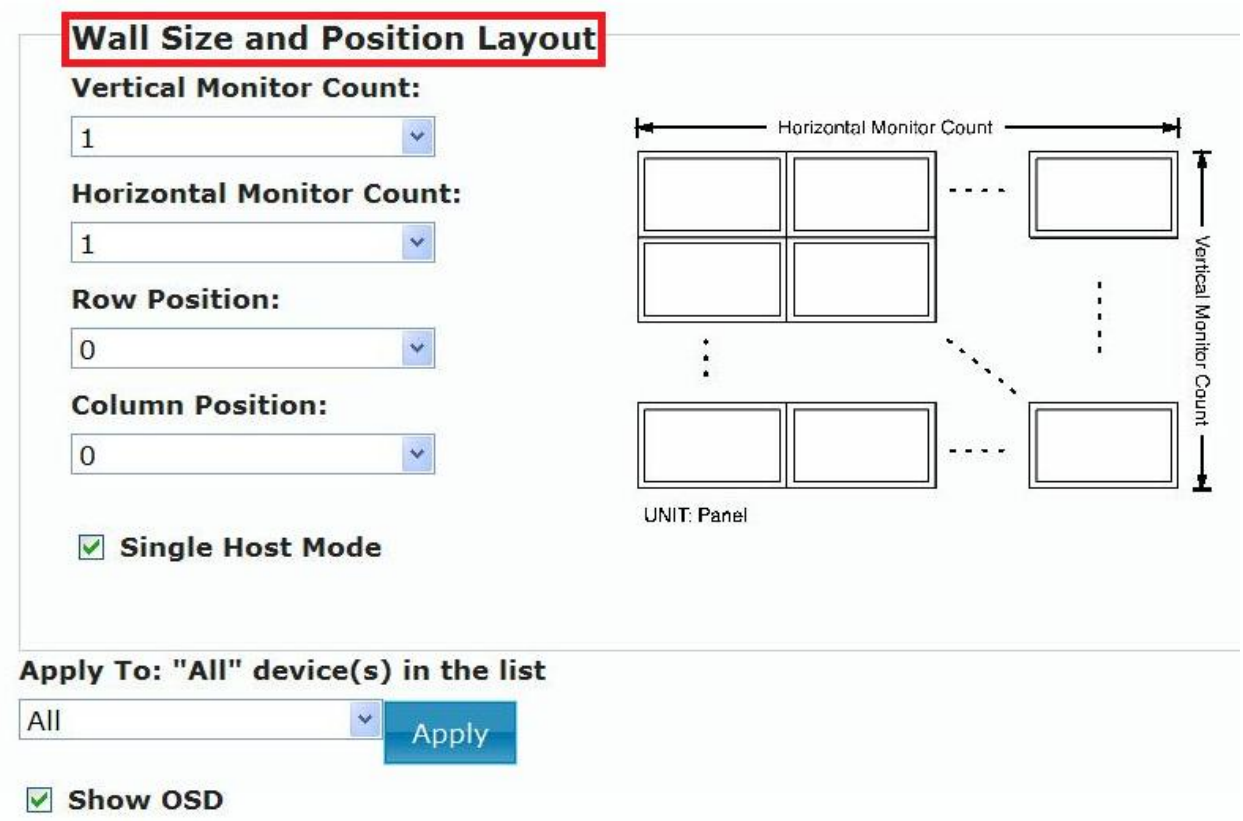
If f = 1.5cm, then f = 15mm = 150 UNIT

Set the gap X = 1mm = 10 UNIT,

By (*), we can obtain VW = 5280.

The OH and VH could be obtained by the same method. Or keep the default value 0 of OW, OH, VW, VH to skip the adjustments.

4.5.2. Basic Setup: Wall Size and Position Layout



- Vertical Monitor Count: Number of Monitors in Row
  (e.g. : for 3 x 2 Video Wall, the Vertical Monitor Count is 3)

3 x 2 Video Wall

- Horizontal Monitor Count: Number of Monitors in Column
  (e.g. : for 3 x 2 Video Wall, the Horizontal Monitor Count is 2)

- Row Position: Monitor's Row Position in Video Wall, begins from 0

- Column Position: Monitor's Column Position in Video Wall, begins from 0

  Below is the example for 2 x 2 Video Wall with each Monitor's Row Position and Column Position by (Row Position, Column Position)

2 x 2 Video Wall

(0, 0)	(0, 1)
(1, 0)	(1, 1)

(Row Position, Column Position)

- Single Host Mode: Enable (☑) if the AV source is single

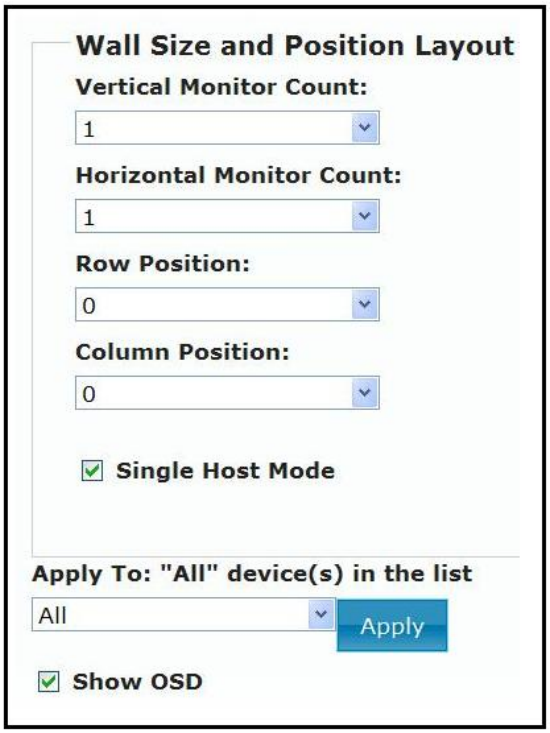
- Apply To: Apply the settings to the chosen device(s) in the list

- Show OSD: The RX's OSD number (e.g. 0 1 2 3) appears on the corresponding

Monitor when Show OSD is enabled (☑). Disable Show OSD and the OSD number will disappear.

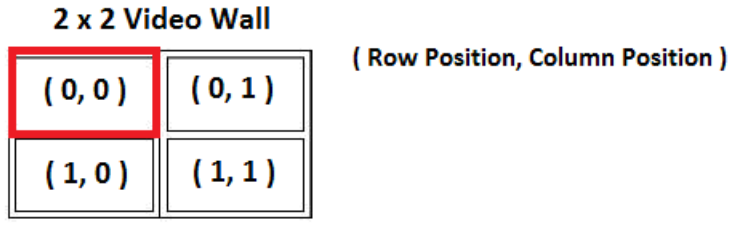
4.6. Single AV Source 2 x 2 Video Wall

4.6.1. Setup all 4 Monitors with the same content by the settings shown on the below figure.



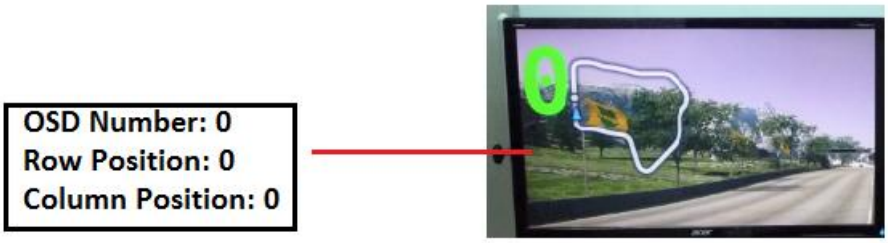
Press Apply then the 4 Monitors are with the same content, please refer to the following example:

4.6.2. Setup the (0, 0) Monitor, i.e. Monitor with Row Position 0 and Column Position 0.

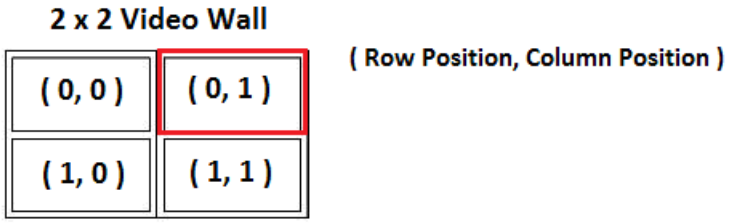


- Vertical Monitor Count: Choose “2”
- Horizontal Monitor Count: Choose “2”
- Row Position: Choose “0”
- Column Position: Choose “0”
- Enable Single Host Mode
- Apply To: Choose “0” (OSD number 0)

Then the first component of 2 x 2 Video Wall on (0, 0) Monitor is obtained.



4.6.3. Setup the (0, 1) Monitor, i.e. Monitor with Row Position 0 and Column Position 1.



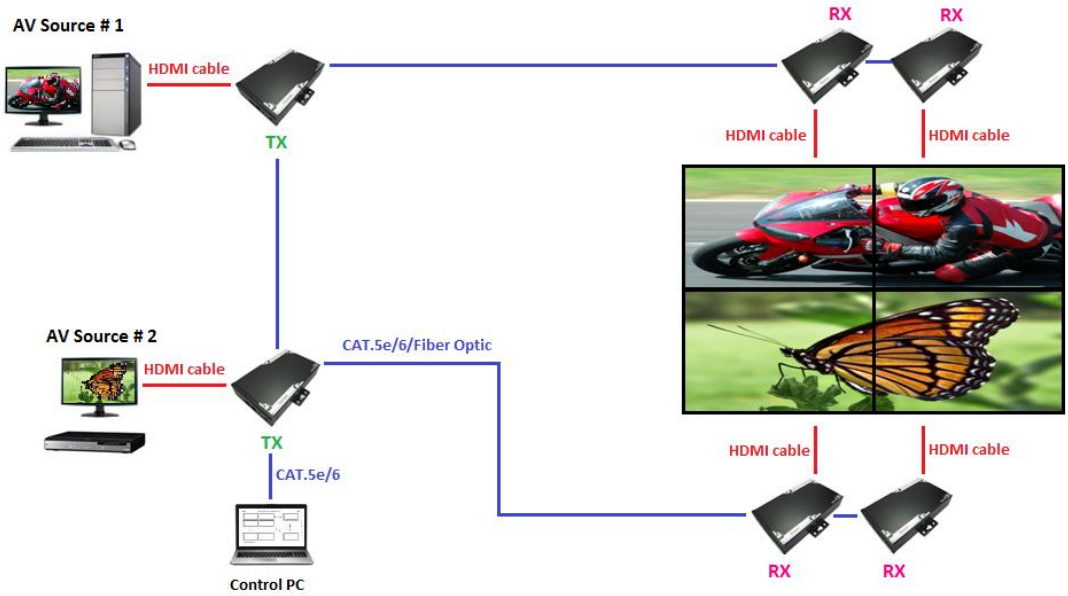
- Vertical Monitor Count: Choose “2”
- Horizontal Monitor Count: Choose “2”
- Row Position: Choose “0”
- Column Position: Choose “1”
- Enable Single Host Mode
- Apply To: Choose “2” (OSD number 2)

Then the 2nd component of 2 x 2 Video Wall on (0, 1) Monitor is obtained.

By using the same method, the other 2 components will be obtained. The 2 x 2 Video Wall is present after the setup for all 4 Monitors is completed.

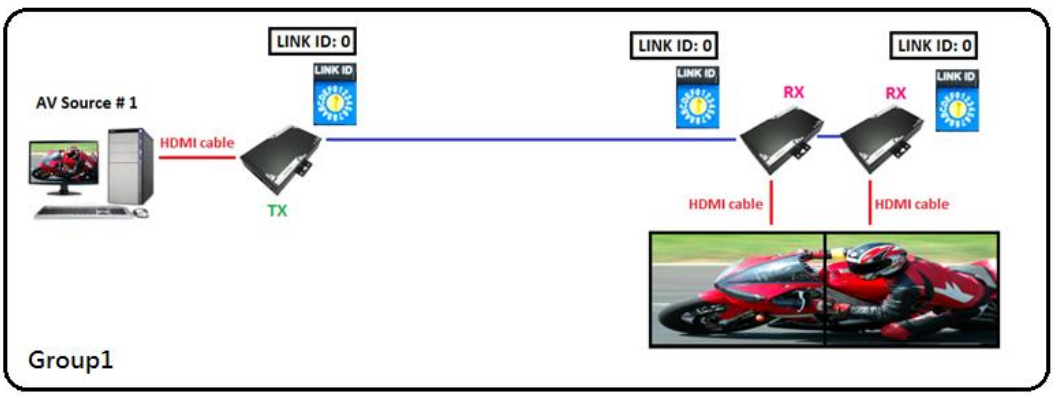
5. Video Wall with Multiple AV Sources

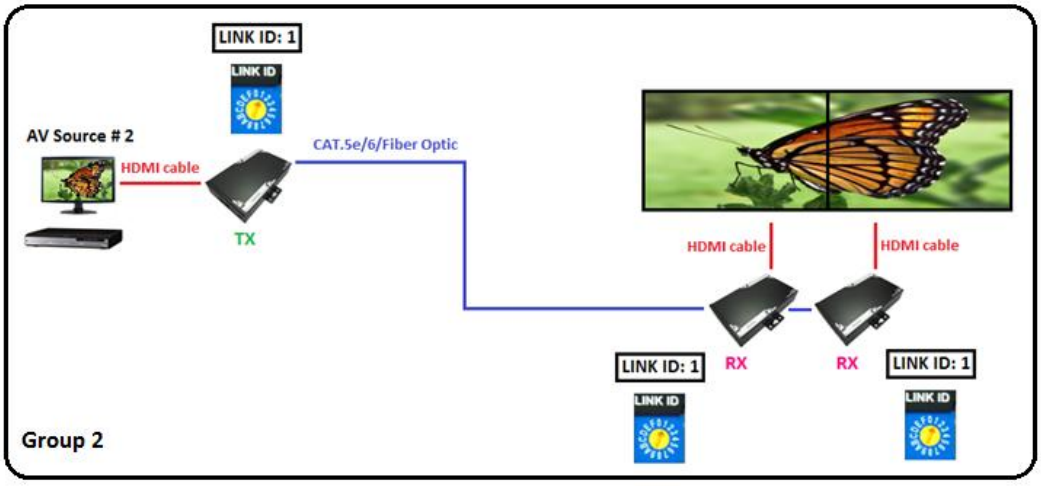
2 AV Sources:



5.1. Setup LINK ID

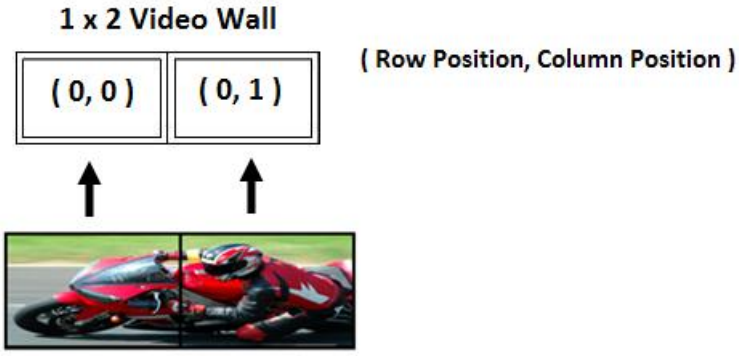
Setup LINK ID such that the TX's and RX's LINK ID are the same in the same group. RESET the unit after the LINK ID is changed.





5.2. Setup all Monitors with same content: please refer to 4.6.1.

5.3. Group 1 is 1 x 2 Video Wall with single AV Source # 1, and the methods for setup Video Wall is the same as in Single AV Source Video Wall.



5.4. Group 2 is 1 x 2 Video Wall with Single AV Source #2 and the setup methods are the same as in 5.3.